Pulmonary Micro-Embolism of Foreign Material Causing Acute Right Ventricular Failure and Cardiac Arrest

Pratik Mondal
Srikanth Yandrapalli
Dennis Roarke
Madhura Hanmantgad
Zeeshan Solangi
New York Medical College, zeeshan_solangi@nymc.edu

See next page for additional authors

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Authors
Pratik Mondal, Srikanth Yandrapalli, Dennis Roarke, Madhura Hanmantgad, Zeeshan Solangi, William H. Frishman, and Sachin Sule

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Pulmonary granulomatosis from foreign body micro-embolism has been described in literature since the 1950s under different terminologies like talc granulomatosis, excipient lung disease, pulmonary foreign body angiolgranulomatosis, etc. It is seen when crushed oral tablets are used intravenously. Tablets contain excipients like talc, cellulose, etc., which are insoluble inert particulate filler. Administered intravenously, these particles lodge in the pulmonary arterioles and capillaries triggering a foreign body response which may vary from a granulomatous reaction resulting in slowly progressive fibrosis and pulmonary hypertension to an acutely fatal reaction leading to small vessel thrombosis and occlusion leading to acute right sided heart failure and cardiac arrest.

A 32-year old incarcerated man with a history of intravenous drug abuse presented to the ER with fever and knee pain. He recently had surgical debridement of a left tibial abscess drug abuse and was discharged with a central venous catheter for antibiotic administration. He had surgical debridement of a left tibial abscess. He had surgery for the abscess. He was emergently transferred to the ICU after which he was discharged with a central venous catheter for antibiotic administration.

Hospital Course

On day 2, he developed chest tightness, shortness of breath, tachycardia with diffuse upsloping ST segment elevations. Arterial pO2 was 50mm Hg. ECG, echocardiogram, computed tomography of chest, infectious workup, and MRI of left knee were unrevealing. He continued to have fevers despite broad spectrum antibiotics. On day 7, chest tightness and SOB acutely worsened. ECG showed sinus tachycardia and diffuse upsloping ST segment elevations. Arterial pO2 was 50mm Hg. Echocardiogram showed severe right ventricular dilatation and dysfunction. It was retrospectively concluded that he had been injecting crushed medications through his central line.

Case Description

Left lower leg: between outer elastic wrap and inner white wrap is an empty normal saline syringe. No evidence of infection. Heart: No significant atherosclerosis, left anterior descending artery tunnels into the myocardium 0.1cm to 0.2cm. Lung: Parenchyma markedly congested with edema, with patent arteries at the hilum. Within the pulmonary arteriole there was presence of polarizable foreign material with cellular response.

With the current epidemic of intravenous drug abuse, we believe that pulmonary granulomatosis from foreign body micro-embolism is appreciably prevalent. A high level of suspicion is needed to diagnose this potentially fatal disease. Diagnosis is attained by a lung biopsy. Systemic and inhaled steroids have shown to decrease symptom severity. The only way to prevent the progression of disease is to stop intravenous drug use, with lung transplantation being the only definitive treatment. There needs to be more research to assess diagnostic and treatment modalities.

Whether ventilation/perfusion imaging would be a more sensitive study to demonstrate the perfusion defect in the pulmonary arterioles, and whether this disease can be considered a subset of chronic thromboembolic pulmonary hypertension and symptomatically be treated with pulmonary arterial vasodilators is still to be assessed.

References:
7. Pratik Mondal, MD; Srikanth Yadrapalli, MD; Dennis Roarke, MD; Madhura Hanmantgad, MD; Zeeshan Solangi, MD; William Frishman, MD; Sachin Sule, MD. Department Of Medicine, New York Medical College, Westchester Medical Center, Valhalla, NY.